

difference of  $10^{\circ}$  between the wet- and dry-bulb thermometer readings, the intersection of the horizontal line marked  $10^{\circ}$  with the vertical line marked  $90^{\circ}$  is found. It is then observed that this point of intersection lies upon a line that indicates a relative humidity of 65 percent. This point of intersection also lies between lines indicating an absolute humidity value between 9 and 10 grains of water vapor per cubic foot. If the interpolation is carefully made, the absolute humidity is found to be about 9.6 grains of water vapor per cubic foot. Passing to the bot-

tom edge of the chart this value of the absolute humidity as determined is found to coincide with a dry-bulb temperature of about  $76^{\circ}$  F. Since the bottom edge of the chart coincides with the 100 percent relative humidity line, saturation would occur at  $76^{\circ}$  F. for an absolute humidity of 9.6 grains of water vapor per cubic foot, and the dew point of the air in question would therefore be  $76^{\circ}$  F.

Chart 2 is used in the same manner; the temperature readings are given in the Centigrade scale and the absolute humidity is given in grams per cubic meter.

## NOTES AND REVIEWS

**On Early Tornadoes in Georgia: Correction.**—The following comments are quoted from a letter received from Col. John P. Finley, relative to the "Note on Early Tornadoes in Georgia," by George W. Mindling, *MONTHLY WEATHER REVIEW*, 66: 14, 1938:

In the preparation of my several papers on tornadoes I was required to be brief, especially as to tabulations, in order to lessen the cost of publication. Accordingly the location of a tornado or a hailstorm was usually indicated by the name of one town, county, or township in the entire track. To have gone into details would have very much increased the cost of publication. The 50 buildings recorded opposite the town of Toccoa, Ga., does not mean that these structures were all destroyed at that place, or even one of them, but somewhere along the path of the storm. For complete details in every instance, the student must refer to the original records of the Signal Service and voluntary observers of the period, on file in the Records Division of the United States Weather Bureau at Washington. These records were supplemented by newspaper clippings, collected at the time of the occurrence of the storms.

As to the paragraph concerning the tornado reported to have occurred at Davisboro, Washington County, Ga., at 6 p. m., February 18, 1884, my records show that it occurred on the 19th. In my Professional Paper No. XVI, published in 1885, and in the American Meteorological Journal of 1890 (State Tornado Charts) tornadoes were reported from 23 counties in Georgia on February 19, 1884. The tornadoes in Washington County, Ga., were reported to the Signal Service by John D. Roberts, of Sandersville, county seat, and by J. M. Minor, of Sun Hill.

EXTRACTS FROM THE MONTHLY WEATHER REVIEW OF THE SIGNAL SERVICE, UNITED STATES ARMY, APRIL 1880: At or near Toccoa, Stephens County, and Mount Airy, Habersham County. These counties are in the extreme NE. portion of Georgia, close to the South Carolina border. The date was April 3, 1880. Toccoa, county seat, Stephens County. In Washington County, in the east central portion of the State on April 4, 1880. Both of these dates were associated with low pressure area No. 1, central on the 3rd and 4th in lower Michigan, with the depression extending south-

ward and conditions favorable to the occurrence of violent local storms in the SE. quadrant. Cautionary signals were ordered at stations throughout the entire Lake Region on April 3 and 4.

Violent local storms, in unusual numbers, occurred during April. Tornadoes, causing loss of life or doing serious injury to property, were reported from Georgia on the 3rd, 4th, and 24th, and from various other States, on other dates. At Dalton, Whitfield County, April 3, p. m., tornado passed 6 miles north of town, extending across Conasauga River into Murray County; 2 persons killed, many injured, and 18 houses completely demolished; path about 1 mile wide; two opposing currents of wind were observable during the progress of the storm, one from the west, the other and most violent from the east. This tornado crossed Grass Mountain near the point at which a similar storm passed in 1878. April 3, near midnight, tornado and waterspout between Mount Airy and Toccoa, Ga. It passed through Murray County, reaching Cherokee 100 miles distant about 2 a. m. Heaviest rainfall for years. About 12 miles of Air Line Railway washed out and bridge over Tugalo River, Stephens County. Hail reported as large as a man's fist. The county is sparsely settled, yet 50 dwellings of all kinds were leveled, 3 persons killed and many badly injured. A hog was found 40 feet from the ground in the fork of a tree. Its passage resembled a cloud of smoke and fire rolling on the ground. Length of path unknown; average about 1 mile. Remarkable amount of rain reported, but no figures given. Elbert County, Ga., south of Stephens County on border of South Carolina, tornado on April 3 passed through north part of county, blowing down many houses and the largest trees.

Washington County, Ga., April 4, during afternoon, tornado passed through southwestern portion of county, demolishing many buildings; track one-half mile wide; direction SW. to NE. At Gainesville, Hall County, Ga., April 4, hailstones 1 inch in diameter. At Savannah, Chatham County, Ga., April 4, hail  $1\frac{1}{2}$  inches in diameter; much glass broken; gardens seriously damaged.

The author of the note was misled in the case of the Toccoa storm by not realizing that the name of a locality was used to designate the entire course of the tornado.—*Editor.*

## BIBLIOGRAPHY

[RICHMOND T. ZOCH, in Charge of Library]

By AMY D. PUTNAM

### RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

**Anniversary volume**, dedicated to Professor Kōtarō Honda on the completion of twenty-five years of his professorship, by his friends and pupils. Sendai. 1936. 3, 8, 8, 1126 p. illus., port., diags.  $26\frac{1}{2}$  cm. (On cover: The science reports of the Tōhoku imperial univ. First series.) Various authors. Text in English, German, or French. "Bibliography," by Nisaku Shibata: p. [1109]–1126.

**Baltimore.** Department of education.

Why the Weather Bureau is important to all people. Occupational classes. Baltimore. January 1937. 42 p.  $27\frac{1}{4}$  cm. Mimeographed.

**Brice, William Malcolm.**

A city laid waste; tornado devastation at Gainesville, Ga., April 6, 1936. Compiled by W. M. Brice. [Atlanta.] c1936. [5]–127 p. illus.  $26\frac{1}{2}$  cm.

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## SOLAR OBSERVATIONS

[Meteorological Research Division, EDGAR W. WOOLARD in charge]

### SOLAR RADIATION OBSERVATIONS, JUNE 1938

By CHARLES M. LENNAHAN

Measurements of solar radiant energy received at the surface of the earth are made at eight stations maintained by the Weather Bureau, and at nine cooperating stations maintained by other institutions. The intensity of the total radiation from sun and sky on a horizontal surface is continuously recorded (from sunrise to sunset) at all these stations by self-registering instruments; pyrheliometric measurements of the intensity of direct solar radiation at normal incidence are made at frequent intervals on clear days at three Weather Bureau stations (Washington, D. C., Madison, Wis., Lincoln, Nebr.) and at the Blue Hill Observatory of Harvard University. Occasional observations of sky polarization are taken at the Weather Bureau stations at Washington and Madison.

The geographic coordinates of the stations, and descriptions of the instrumental equipment, station exposures,

and methods of observation, together with summaries of the data, obtained up to the end of 1936, will be found in the MONTHLY WEATHER REVIEW, December 1937, pp. 415 to 441; further descriptions of instruments and methods are given in Weather Bureau Circular Q.

Table 1 contains the measurements of the intensity of direct solar radiation at normal incidence, with means and their departures from normal (means based on less than 3 values are in parenthesis). At Madison and Lincoln the observations are made with the Marvin pyrheliometer; at Washington and Blue Hill they are obtained with a recording thermopile, checked by observations with a Marvin pyrheliometer at Washington and with a Smithsonian silver disk pyrheliometer at Blue Hill. The table also gives vapor pressures at 8 a. m. (75th meridian time) and at noon (local mean solar time).

During June 1938 direct solar radiation intensities averaged above normal at Blue Hill and Madison, about normal at Lincoln, and below normal at Washington.